

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

F-323

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)

10/030862INTERNATIONAL APPLICATION NO.
PCT/CH00/00351INTERNATIONAL FILING DATE
29 June 2000PRIORITY DATE CLAIMED
13 July 1999 and 31 January 2000

TITLE OF INVENTION

TWO-PART PLASTIC SNAP HINGE CLOSURE

APPLICANT(S) FOR DO/EO/US

Werner Fritz DUBACH

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
 2. ☐ This is a **SECOND OR SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
 3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
 4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
 5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
 6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
 7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
 8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
 9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
 10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
- Items 11. to 16. below concern other document(s) or information included:
11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
 12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
 13. ☐ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
 14. ☐ A substitute specification.
 15. ☐ A change of power of attorney and/or address letter.
 16. ☒ Other items or information:
 - Form PCT/IB/301
 - Form PCT/IB/304
 - Form PCT/IB/308
 - Form PCT/ISA/210 (English language version, 3 pages)
 - Certificate of Mailing by Express Mail (2 pages)
 - Return Receipt Postcard

EXPRESS MAIL NO.: EL859244702US
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U.S. APPLICATION NO. (unknown, see 37 CFR 1.52)

INTERNATIONAL APPLICATION NO.

PCT/CH00/00351

ATTORNEY'S DOCKET NUMBER

F-323

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO \$ 890.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) \$ 710.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482)
but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$ 740.00Neither international preliminary examination fee (37 CFR 1.482) nor
international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$ 1,040.00International preliminary examination fee paid to USPTO (37 CFR 1.482) and
all claims satisfied provisions of PCT Article 33(2)-(4) \$ 100.00**CALCULATIONS**

PTO USE ONLY

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$ 890.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from
the earliest claimed priority date (37 CFR 1.492(e)).

CLAIMS

NUMBER FILED

NUMBER EXTRA

RATE

Total claims

* - 20 =

X \$18.00

Independent claims

- 03 =

X \$84.00

MULTIPLE DEPENDENT CLAIM(S) (if applicable)

+ \$280.00

TOTAL OF ABOVE CALCULATIONS =

\$ 890.00

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement
must also be filed (Note 37 CFR 1.9, 1.27, 1.28).**SUBTOTAL =**

\$ 890.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 CFR 1.492(f)).

+

TOTAL NATIONAL FEE =

\$ 890.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an
appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

+

TOTAL FEES ENCLOSED =

\$ 890.00

* Based upon entry of the First Preliminary Amendment.

Amount to be:

refunded

\$

charged

\$

a. ☒ A check in the amount of \$ 890.00 to cover the above fee is enclosed.b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 19-3550. A duplicate copy of this sheet is enclosed.**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b))
must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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REGISTRATION NUMBER

3 07 2002 03 JUN 2002
Rec'd PCT/PTO 03 JUN 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Werner Fritz DUBACH

Title: TWO-PART PLASTIC SNAP HINGE
CLOSURE

Based Upon: PCT/CH00/00351

Express Mail No.: EV068478955US

Date of Deposit: 03 June 2002

FIRST PRELIMINARY AMENDMENT

Box PCT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please amend the subject Patent Application as follows to place this
Patent Application in better condition for examination:

In the claims, substitute the following Claims 1-23 (Amended) in place
of the original Claims 1-23 from the published PCT International Application:

1. (Amended) In a two-part hinge closure (3) having a lower part
(1) which can be placed on a container and having a circumferential first casing wall
(10), and a cap (2) which can be connected with the lower part (1) by a movable hinge
and has a second casing wall (20), wherein the lower part (1) and the cap (2) are made
separately of each other and can be assembled together, wherein in an assembled,

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closed state the first casing wall (10) and the second casing wall (20) extend flush above each other, the improvement comprising: the lower part (1) and the cap (2) connectible with each other by a snap hinge having at least one spring element (24, 124, 204) and at least one coupling element (27, 127, 270), in the closed state of the closure (3) the at least one spring element (24, 124, 204) and the at least one coupling element (27, 127, 270) at least approximately flush with the first casing wall (10) and the second casing wall (20) and are formed in one piece.

2. (Amended) In the two-part hinge closure in accordance with claim 1, wherein the lower part (1) has at least one of a pouring spout (12) and a pouring opening, and the cap (2) has a sealing element (33) which sealingly acts together with the at least one of the pouring spout (12) and the pouring opening in an interlocking manner.

3. (Amended) In the two-part hinge closure in accordance with claim 1, wherein the at least one spring element has two strap retainers (24), wherein ends of the strap retainers (24) project away from one of the lower part (1) and the cap (2) on which each of the strap retainers is injection-molded and are connected with each other by the at least one coupling element (27).

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4. (Amended) In the two-part hinge closure in accordance with claim 1, wherein the at least one spring element (124, 204) has a snap hinge (101, 200) bordered by two curved film hinges which approach each other and then move away from each other, wherein one of the film hinges (125, 202) forms a first connection with the cap (2) to which the at least one spring element is injection-molded, and an other of the film hinges (126, 204) forms a second connection with the at least one coupling element (127, 270).

5. (Amended) In the two-part hinge closure in accordance with claim 4, wherein the at least one spring element (124) which includes a snap hinge (101) is a flexible material strip (100) on which the at least one coupling element (127) is formed.

6. (Amended) In the two-part hinge closure in accordance with claim 1, wherein a concentric receiving slit (16) which is offset toward a center by a thickness of a casing is provided on one of the lower part (1) and the cap (2), in which the at least one coupling element which is fixedly connected with an other of the lower part (1) and the cap (2) is received in an at least one of an interlocking manner and a frictionally connected manner.

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7. (Amended) In the two-part hinge closure in accordance with claim 6, wherein the one of the lower part (1) and the cap (2) with the receiving slit (16) has at least one recess (14) which secures free mobility of the at least one spring element (24, 124) during an opening and closing movement.

8. (Amended) In the two-part hinge closure in accordance with claim 5 wherein, at least one rib (128) of one of the lower part (1) and the cap (2) connected in a snapped-in fashion with ribs (122) on an other of one of the lower part (1) and the cap (2), is provided on the at least one coupling element (127) which is connected in one piece with the lower part (1) and the cap (2).

9. (Amended) In the two-part hinge closure in accordance with claim 1, wherein a security strip (4) is injection-molded to one of the lower part (1) and the cap (2) on which the at least one spring element (24, 124) and the at least one coupling element (27, 127) are arranged.

10. (Amended) In the two-part hinge closure in accordance with claim 9, wherein the at least one coupling element (27, 127) and the security strip (4) extend at least by a same distance above a casing wall edge of one of the lower part (1) and the cap (2).

14. (Amended) In the two-part hinge closure in accordance with claim 1, wherein the lower part (1) and the cap (2) are injection molded from at least one of a different plastic material and a different color.

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15. (Amended) In the two-part hinge closure in accordance with claim 14, wherein at least one of the lower part (1) and the cap (2) is made of PET.

16. (Amended) In the two-part hinge closure in accordance with claim 1, wherein the at least one coupling element (27, 127, 270) in an assembled state forms a part of one of the first casing wall (10) and the second casing wall (20).

17. (Amended) In the two-part hinge closure in accordance with claim 1, wherein a pressing element (19) is arranged on one of the lower part (1) and the cap (2) which in an assembled state keeps the at least one coupling element (27, 127) frictionally connected with retaining projections (19').

18. (Amended) In the two-part hinge closure in accordance with claim 4, wherein the at least one spring element (204) is arranged between the cap (2) and a ring-shaped coupling element (270) which is formed flush on the second casing wall (20) by a tear seam (271).

19. (Amended) In the two-part hinge closure in accordance with claim 18, wherein in an upper area (211) the first casing wall (10) has a shoulder (212) which is offset inward by a thickness of the first casing wall (10).

23. (Amended) In the two-part hinge closure in accordance with claim 22, wherein the cap (2) has a pressure bead (205) on a lower edge of the second casing wall (20) which is interlockingly held by the retaining lip (402).

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ABSTRACT OF THE DISCLOSURE

A two-part hinge closure having a lower part which has a surrounding outer wall and which can be placed on a container, and has a cap which has an outer wall and which can be joined to the lower part in a hinged manner. The lower part and the cap are separately produced and can be assembled together. In an assembled and closed state, the outer walls are situated above each other in an aligned manner, at least in the hinge area of both hinge closure parts. Both closure parts can be joined to one another by a snap hinge having at least one spring element and at least one coupling piece. When the closure is in a closed state, the at least one spring element and the at least one coupling piece are at least almost aligned with the outer wall of the closure part on which they are formed as one piece.

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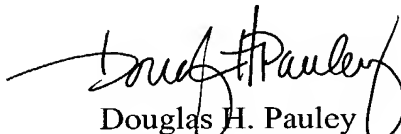
REMARKS

Applicant respectfully requests entry of the above Preliminary Amendment to place this Patent Application in better form for examination and prosecution before the U.S. Patent and Trademark Office.

The claims have been amended to eliminate multiple dependent claims and to more definitely and fully claim the subject matter of Applicant's invention. Applicant urges that the above Preliminary Amendment introduces no new matter into this Patent Application.

Applicant sincerely believes that this Patent Application is now in condition for examination and prosecution before the U.S. Patent and Trademark Office.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) In a [A] two-part hinge closure (3)[, consisting of] having a lower part (1)[,] which can be placed on a container and [has] having a circumferential first casing wall (10), and a cap (2)[,] which can be connected with the lower part (1) [it] by [means of] a movable hinge and has a second casing wall (20), wherein [both parts] the lower part (1) and the cap (2) are made separately of each other and can be assembled together, [and] wherein [furthermore] in [the] an assembled, closed state the first casing [walls (10, 20) of both hinge closure parts (1, 2)] wall (10) and the second casing wall (20) extend flush above each other, [characterized in that the two parts (1, 2) can be connected] the improvement comprising: the lower part (1) and the cap (2) connectible with each other by a snap hinge[, consisting of] having at least one spring element (24, 124, 204) and at least one coupling element (27, 127, 270), [wherein] in the closed state of the closure (3) the at least one spring element (24, 124, 204) and the at least one coupling element (27, 127, 270) [are] at least approximately flush with the first casing wall [(10, 20) of the closure part (1, 2)] (10) and the second casing wall (20) and are [on which they have been] formed in one piece.

with claim 1, [characterized in that] wherein the lower part (1) has at least one of a pouring spout (12) [or] and a pouring opening, and the cap (2) [is provided with] has a sealing element (33)[,] which sealingly acts together with the at least one of the pouring spout (12) and the [or] pouring opening in an interlocking manner.

3. (Amended) In the [The] two-part hinge closure in accordance with claim 1, [characterized in that] wherein the at least one spring element [consists of] has two strap retainers (24), wherein [the] ends of the strap retainers (24)[, which] project away from one of the lower part (1) and the cap (2) [the closure part] on which [they have been] each of the strap retainers is injection-molded[,], and are connected with each other [via] by the at least one coupling element (27).

4. (Amended) In the [The] two-part hinge closure in accordance with claim 1, [characterized in that] wherein the at least one spring element (124, 204) [includes] has a snap hinge (101, 200)[, which is] bordered by two curved film hinges[, which approach each other [in their course] and then move away from each other [again], wherein one of the [one] film [hinge] hinges (125, 202) [constitutes the] forms a first connection with the cap [closure part] (2)[, to which the at least one spring element [has been] is injection-molded, and [the] an other of the film [hinge]

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hinges (126, 204) [constitutes the] forms a second connection with the at least one coupling element (127, 270).

5. (Amended) In the [The] two-part hinge closure in accordance with claim 4, wherein [characterized in that] the at least one spring element (124) which includes [the] a snap hinge (101) is a flexible material strip (100)[,] on which [whose extension] the at least one coupling element (127) is formed.

6. (Amended) In the [The] two-part hinge closure in accordance with claim 1, wherein [51, characterized in that] a concentric receiving slit (16)[,] which is offset toward [the] a center by [the] a thickness of a [the] casing[,], is provided on one of the lower part (1) and the cap (2) [the closure part (1, 2)], in which the at least one coupling element[,], which is fixedly connected with [the] an other of the lower part (1) and the cap (2) [closure part (1, 2)] is received in an at least one of an interlocking manner and a [and/or] frictionally connected manner.

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10. (Amended) In the [The] two-part hinge closure in accordance with claim 9, [characterized in that] wherein the at least one coupling element (27, 127) and the security strip (4) extend at least by [the] a same [amount] distance above [the] a casing wall edge of one of the lower part (1) and the cap (2) [the closure part (1, 2) on which they are arranged].

11. (Amended) In the [The] two-part hinge closure in accordance with claim 5, [characterized in that on one closure part the circumferential] wherein one of the first casing wall [(10, 20)] (10) and the second casing wall (20) has a recess (120) which has [at least the] a shape and a size of [the] a material strip (100) which [has been] is injection-molded on [the] an other [closure part] of the lower part (1) and the cap (2).

12. (Amended) In the [The] two-part hinge closure in accordance with claim 1, [characterized in that] wherein a security strip (4) is arranged on one [closure part (1, 2),] of the lower part (1) and the cap (2) which extends around [the closure (3)] as far as [the] a hinge area of the closure.

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13. (Amended) In the [The] two-part hinge closure in accordance with claim 1, [characterized in that the] wherein a security strip (400) is arranged on [each closure] the lower part (1) which is free of [the] a spring element (204) and the at least one coupling element (270) and is at least approximately completely circumferential.

14. (Amended) In the [The] two-part hinge closure in accordance with claim 1, [characterized in that the two closure parts (1, 2)] wherein the lower part (1) and the cap (2) are injection molded from at least one of a different plastic material and a [and/or in] different [colors] color.

15. (Amended) In the [The] two-part hinge closure in accordance with claim 14, [characterized in that at least one closure part (1, 2)] wherein at least one of the lower part (1) and the cap (2) is made of PET.

16. (Amended) In the [The] two-part hinge closure in accordance with claim 1, wherein [characterized in that] the at least one coupling element (27, 127, 270) [is designed in such a way that] in [the] an assembled state [it constitutes] forms a part of one of the first casing wall (10) and the second casing wall (20) [on the closure part on which it can be assembled].

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17. (Amended) In the [The] two-part hinge closure in accordance with claim 1, wherein [characterized in that] a pressing element (19) is arranged on one [closure part] of the lower part (1) and the cap (2) which[,] in [the] an assembled state keeps the at least one coupling element (27, 127) [on the other closure part] frictionally connected with retaining projections (19') [of the first-mentioned closure element].

18. (Amended) In the [The] two-part hinge closure in accordance with claim 4, wherein [characterized in that] the at least one spring element (204) is arranged between the cap (2) and a ring-shaped coupling element [(27=),] (270) which is formed flush on the second casing wall (20) [via] by a tear seam (271).

19. (Amended) In the [The] two-part hinge closure in accordance with claim 18, wherein [characterized in that] in [the] an upper area (211) the first casing wall (10) has a shoulder (212)[,] which is offset inward by [the] a thickness of the first casing wall (10).

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20. (Amended) In the [The] two-part hinge closure in accordance with claim 19, wherein a [characterized in that the] security strip (400) is formed [via] by a predetermined breaking seam (401) in [the] an area of the shoulder (212).

21. (Amended) In the [The] two-part hinge closure in accordance with claim [claims 18 and] 19, wherein a second [characterized in that the] upper area (210) of the second casing wall (20) [is provided with] has retaining notches (211) and the at least one coupling element (270) [is provided with] has retaining beads (206) which interlockingly fit into [the] retaining notches.

22. (Amended) In the [The] two-part hinge closure in accordance with claim 20, [characterized in that] wherein the security strip (400) has a retaining lip (402)[,] which interlockingly extends over a portion of the cap (2).

23. (Amended) In the [The] two-part hinge closure in accordance with claim 22, [characterized in that] wherein the cap (2) has a pressure bead (205) on [the] a lower edge of the second casing wall (20)[,] which is interlockingly held by the retaining lip (402).

PTO/SB/10 (10-92)

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BACKGROUND OF THE INVENTION
Field of the Invention

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TWO-PART PLASTIC SNAP HINGE CLOSURE

This
[The present invention relates to a two-part hinge closure, [consisting of] a lower part, which can be placed on a container, and [has] a circumferential casing wall, and a cap, which can be connected with [it] by [means of] a movable hinge and [has] a casing wall, wherein both parts are made separately of each other and can be assembled together, and [wherein] furthermore in [the] assembled, closed state the casing walls of both hinge parts extend flush above each other.]

having
the lower part?
Both
an

Description of Related Art

Hinge closures made of plastic have been on the market for approximately forty years. In the simplest forms, such hinge closures made of plastic consist of a lower part and a cap, wherein the lower part and the cap are connected as one piece by [means of] a film hinge. In most cases these are not snap hinge closures. These [came] on the market in large numbers only approximately ten years later. In the meantime the various embodiments of plastic closures with snap hinges [have practically conquered] the entire hinge closure field.

closures
overwhelm

The designs for plastic closures with snap hinges have become more and more complicated [these days]. The production of plastic snap hinge closures becomes more and more complex and expensive because of the additional integration of a security strip. The plastic snap hinge closures are [a] single-piece and usually are loaded from the direction of the lower part during injection molding. The entire material must be pressed from the injection

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location through the lower part, and thereafter via at least one film hinge into the cap, and the ^{lower part} [latter] must be loaded. If there is ^{also} a security strip [in addition], it is [also] necessary to load it with material via very thin connecting points. This leads to the cycle times for injection molding and closing of such plastic parts hardly permitting cycle times below twenty seconds, even with the most modern machinery and optimum design of the injection molds.

Also [Moreover], the respective closures injection- molded in the open state ^{have} [entail] more problems during ejection. Often the security strips, or also the spring elements which cause the snap action of the snap hinge, [already] become damaged during ejection from the injection mold.

Two-part plastic closures have also been known [for some years]. Here, the productions as two parts has different reasons, but they are always connected directly or indirectly with the hinge. For example, it ^{is} [has been long] known that the sturdiness of the hinges of single-piece snap hinge closures is relatively low and they tend to tear because of the forces which are introduced in a disadvantageous manner into the film hinges.

Accordingly, it is proposed in ^{European Patent Reference} EP-A-0 629 560 to produce the lower part and the cap of a snap hinge closure separately and to manufacture a separate hinge element, with which the two closure parts can be connected with each other, from a rubber-like plastic material.

^{U.S. Patent} [US-A] 5,381,920 also shows a similar solution, wherein a tool box made of plastic is manufactured from a separate lid and a separate lower part, wherein a pure hinge

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element can be inserted into appropriate receivers of both parts and [in this way] ^{thus} hingedly ^{connect} [connects] the two parts.

A single-piece plastic closure is known from ^{German Patent Reference} DE-A-195 17 102, wherein the spring element of the snap hinge is separately made. This permits the production of a closure with a spring force of the closure specified by the customer, wherein it is simultaneously possible to work with a considerably simpler injection mold permitting higher cycling times.

True two-part closures [corresponding to the preamble of claim 1] are known from ^{German Patent Reference} DE-A-37 03 193, as well as ^{European Patent Reference} EP-A-0 583 204. In both cases these are not snap hinge closures, but only hinge closures. [The reasons for making these] ^{These} closures ^{are made} [in two pieces] ^{because} [are to be mainly seen in that] they are relatively large closures, which are intended for long-term use. Accordingly it is desirable, for example, that such closures can also be disassembled again for cleaning, in order to be able to reassemble them later in [their] ^a clean state for continued use.

In this regard [the present] ^{9, this} invention has a completely different object. Longevity is ^{of} [here] no [longer of] ^{real} interest, but [instead essentially] ^{rather} [the cheapest possible production. [In the course of this] ^{thus} it is [particularly] intended to prevent large amounts of plastic material from having to flow over thin places, for example film hinges.

This object is attained [by the] ^{with a} two-part design of [the] ^a hinge closure having [the] characteristics [of claim 1]. ^{described in this specification and in the claims}

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[Thanks to] ^{with} the two-part design, the amount of plastic per closure part is reduced to approximately half that of a single-piece closure. [This means that with] ^{Thus} plastic parts ^{are} simplified and reduced [in this way] ^{and} it is possible to operate with much shorter cycle times. In particular, cycle times between four and eight seconds are possible. [Moreover, thanks to] ^{Also, with} the smaller parts it is possible to arrange [practically] ^{nearly} twice as many cavities per injection mold. The relatively simple and small plastic parts make it also possible to operate with so-called tier tools without any special ^{cost} outlay, which multiply the capacity as a function of the number of tiers. This means that with the same plastic injection molding machine it is practically possible to produce approximately three to ten times more two-part plastic hinge closures than single-piece snap hinge closures with the customary technology. Although such a manufacture demands an additional assembly machine, it is known from analogous uses that the capacity of such assembly machines is enormously great [so that] ^{Thus,} it is possible to easily process the production capacity from two plastic injection molding machines with one assembly machine and with the technology represented here.

In addition to the purely economic advantages, a plastic closure produced in two parts offers [still] further advantages. The lower part and the upper part can [of course] be designed in different colors without problems. Furthermore, the cap and the lower part can also be manufactured from different plastic materials. [In this way] ^{Thus} it is possible in particular to produce a hinge closure wherein the lower part can be made from PET. It is [therefore]

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BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of ^{this} the subject of the invention are represented [by way of example] in the assembled and unassembled states in the attached drawings, wherein:

Fig. 1 shows ^{a lateral view of} a lower closure part in ^{an} the unassembled state, in a lateral view in the direction toward the hinge area, while;

Fig. 2 ^{shows a lateral view of} represents a matching cap with a security strip, also in ^{an} the unassembled state in the same view. In;

Fig. 3 ^{shows a lateral view of} the two closure parts in Figs. 1 and 2 are represented in the ^{an} assembled state, wherein the viewing ^{viewed in a} direction is the same as ^{an} with the previously represented individual closure parts.;

Fig. 4 shows a ^{top} view ^{of} from above on the lower closure part in Fig. 1, ^{shown} again in the unassembled state and;

Fig. 5 shows ^{a bottom} a view ^{shown} of the upper closure part, or the cap, in Fig. 2 in a plan view from below.;

Fig. 6 shows the lower part of a second closure ^a variation, wherein ^a the spring element and the coupling element are arranged in one piece on ^a the lower part, the same as a security strip.;

Fig. 7 shows ^{a lateral view of} the matching cap, in the same ^{direction} lateral view as the lower part in Fig. 1, and;

Fig. 8 shows the closure with the two closure parts ^{shown} in Figs. 6 and 7 ^{but} in ^{the} assembled state ⁱⁿ;

Fig. 9 ^{shows} the lower part ^{shown} in Fig. 6 ^{but} is represented in a lateral view and rotated by 90°, wherein the spring element and the coupling element are shown ^{practically} pivoted downward by ^{practically} 180°, which corresponds to ^a the manufacturing position []];

Fig. 10 ^{shows} represents ^a a center vertical section ^{taken} through an assembled two-part closure on an enlarged scale []];

Fig. 11 ^{shows} represents ^a a diametrical vertical section ^{taken} through a further embodiment of a cap ^{and} []];

Fig. 12 ^{shows a similar} the same ^{taken} section through a lower part matching the cap ^{shown} in Fig. 1 []];

Fig. 13 shows ^{an} the assembled closure ^{with} consisting of ^{the} the lower part and the cap in Figs. 11 and 12 in a front view ^{and in} []] and

Fig. 14 ^{shows} in ^a a rear view ^{of the assembled closure as shown in Fig. 13}

DESCRIPTION OF PREFERRED EMBODIMENTS

The closure in accordance with ^{this} the invention ^{has} consists of two individual parts which are separately produced. These are ^{on the one hand} the lower part 1 and ^{on the other hand} the upper part or cap 2. Only in the assembled state do these two closure parts 1, 2 result in the complete closure 3, as ^{shown} represented in Figs. 3, 8, 13 and 14. For ^{this} the invention ^{here disclosed}, the presence of casing walls on the lower part 1, as well as on the cap 2, is ^{absolutely} necessary in order to obtain a closure which is simple to assemble, has no

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protruding elements and also meets ^{a problem} [all] ^{problematical} [] ^{for} [the] ^{entire} handling during assembly, as well as for packaging the containers with the corresponding closures. ^{Also,} [Added to this is that] ^{protruding or strongly snapping} elements can practically be produced only with appropriate gate valves which ^{on the one} [] ^{hand,} make the tools complex and increase the cycling times. Accordingly, only the security strips of the closures in accordance with ^{this} [the] ^{invention} slightly protrude ^{with} [in] ^{respect to} the casing walls.

It is generally necessary for all embodiments that the casing walls of both closure parts ^{1 and 2} be arranged so that they are flush above each other in the assembled state, however, this does not necessarily require that the casing walls extend vertically. It is sufficient ^{for} [that] ^{the casing walls of both parts} [are only] ^{to be} flush with each other ^{only} [in the hinge area], ^{and thus there is} in the assembled state. This is not required in the remaining areas, ^{so that} [] ^{complete freedom} of design ^[is maintained]. In contrast to plastic closures produced in one piece, it is possible without problems ^{using} [by means of] ^{the technology} in accordance with ^{this} [the] ^{invention} to design closures which as a whole have a conical shape. A further general characteristic of the two-part closures in accordance with ^{this} [the] ^{invention} ^{is} [lies in] ^{that} for all practical purposes the basic arrangement of the parts ^{forming} [constituting] ^{the hinge} can be arranged in an arbitrarily interchanged manner. This means that with practically the same embodiment the respective spring elements, or the at least one spring element and the at least one coupling element, can be

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arranged either in the lower part 1 or on the cap 2, and correspondingly the receivers which are engaged by the parts of the coupling element can be attached to the respectively other closure part. [Of course, the ^{The concept} same also applies to the placement of the security strip.

Accordingly, one closure element and another closure element are often mentioned in the following description in order to [make the ^{clarify} interchangeability of the terms ~~the~~ lower part and ^{the} cap clear].

A first embodiment is represented in Figs. 1 to 5. The lower closure part ¹ in Fig. 1 has a cylindrical casing wall 10. The lower part 1 [of course] has fastening means with which the lower part 1 can be fastened on a container. ^{The fastening means} [These] are [completely] conventional [means such as], for example, a screw thread arranged on the inner wall of the cylindrical casing wall 10, or [also] fastening cams or fastening beads, depending on whether it is intended to screw or press the lower part 1 on a container.

On the top, the lower part 1 is closed off by a cover surface 11, in which a pouring opening or, as in this case ^{a conventional manner,} a pouring spout 12, is arranged. In ^{the customary way} the pouring spout [is equipped with] ^{has} a circumferential sealing or holding bead 13. [Moreover, ^{Recesses} recesses 14 ^{are shown} can be seen] in the lateral view [in] Fig. 1, which permit the movable spring elements to be [left] free. These cutouts are inwardly offset toward the center in relation to the outer surface of the casing wall 10. The recesses 14 can be offset so far toward the interior that openings are created, which communicate with the interior space of the lower part 1 or,

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as represented here, are ^{is shown,} [still] closed [off] by the casing wall. A cam 15 placed on the cover surface 11 ^{can furthermore be seen} which ^{during} in the course of the closing process of the assembled closure is used as a stop for the cap edge and ^{thus} [therefore] makes a main hinge between the lower part 1 and the cap 2 superfluous.

^{The} [A] cap 2 matching the lower part ^{1, as} in Fig. 1, is shown in Fig. 2. In this embodiment a security strip 4 ^{is} [has been] applied by injection molding to the cap 2. The cap 2 has a cover surface 21, which is ^{shown, the} [which is] adjoined by a circumferential casing wall 20. In the example ^{here represented this} casing wall 20 extends vertically ^{with} [in] respect to the cover surface 21. However, as already mentioned, the casing wall ²⁰ could also extend inclined ^{with} [in] respect to the cover surface 21, so that the entire cap ² has a conical shape. ^{This} [Of course this] would require a corresponding shape of the lower part 1 and its casing walls 10. The security strip 4 is arranged on the lower edge 22 of the cap 2 via strips 41 which act as predetermined breaking points. Slits 23 can be seen, which are oriented upward from the lower cap edge and leave the spring elements 24 free, which are connected in one piece with the cap 2. The transition of the spring elements 24 to the casing wall 20 ^{occurs} [takes place] via film hinges or thin places 25, which here extend obliquely. On their lower end, the two spring elements 24 are connected with each other via a bridge-like coupling element 27. The transition from the coupling element 27 to the two spring elements 24 can also ^{occur} [take place] via film hinges 26.

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[instead, they] ^{but rather} only [come into] contact [with] each other during closing and then provide a corresponding restoring force, such as is customary with snap hinges.

As [can be clearly seen] ^{shown} in Fig. 3, such a two-part closure provides an esthetically perfect solution which hardly shows that this is not a single-piece closure.

[As already mentioned,] Fig. 4 shows the lower [closure] part ^l in a ^{top} view [from above]. Here the ^{The} cover surface 11 with the pouring spout 12 arranged in the center [can be] is clearly seen. This view is used in particular to show the arrangements of the cutouts, or openings, into which the coupling element 27, or the spring elements 24, can be pushed. In a radially outward extending direction from the spout 12 arranged in a centered manner, it is possible to first distinguish the cam 15, which is used as a stop for the cap edge during the opening, or closing, operation, after which an elongated receiving slit 16 [can be] is distinguished, which is arranged further outward and extends concentrically in relation to the outer wall. [This] ^{The} receiving slit ¹⁶ extends through the cover surface 11 and can also be arranged to extend as a depression partially in the inner wall of the lower part 1. The receiving slit 16 communicates with the two laterally arranged recesses 14, in which the spring elements 24, in this case two strap retainers, come to rest in the assembled state. The required free mobility of the spring elements 24 is provided [thanks to] ^{by} the adaptation of the shape of [these] ^{the} recesses 14. The casing wall 10 of the lower part 1 remains standing between the two recesses 14.

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Fig. 5 shows a ^{bottom} [plan] view of the cap 2 [from below]. A sealing plug 33 is arranged centered in the cover surface 21 of the cap 2, which can extend sealingly around the pouring spout 12. The security strip 4 extends around the casing wall 20, offset radially outward from ^{the casing wall 20} it. The connection between the casing wall 20 and the security strip 4 is provided via webs 41. In this view, the coupling element 27 appears to be like a thinned wall area. The normal wall thickness shows the center area 35, which ^{forms} [constitutes] the casing wall area ^{as} [left] free. [Here, too, the ^{The} cap ² again ^{transitions} makes a transition] into full wall strength at the end of the spring elements. ^{The} of course, the outer casing wall line is only shown in dashed lines for clarity in order to show the differences in wall thickness between the casing wall ²⁰ [on the one hand] and ^{between} the spring elements 24 and the coupling element 26 [on the other hand].

A second variation of the two-part plastic closure [in accordance with the] of this invention is represented in Figs. 6 to 9. [Here, too, the ^{The} lower part ^{is} has been identified by 1, ^{element reference numeral} the cap by 2 and the entire closure by 3. The reference numeral 4 ^{is} has again been selected for the security strip, and 41 also means the connecting webs 41 here, with which the security strip is fastened, in this case on the lower part 1.

The lower part 1 in Fig. 6 [here again] has a circular- cylindrical casing wall 10. A vertically raised material strip 100 extends flush with this outer surface of the casing wall and comprises a snap hinge 103 having a center area 124, which has a function corresponding to the spring element 24 in the previous embodiment. Here, the transition of

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this spring element 124 to the lower part 1, or to the casing wall 10 of the [latter] ^{lower part 1} [takes place
 via] ^{occurs by} a film hinge 125 extending in an arc. A diametrically opposed film hinge 126 [constitutes
 the] ^{forms a} line of separation between the spring element 124 and the coupling element 127
 [following it]. Both film hinges 125 and 126 are shown in dashed lines, [since] ^{because} they can hardly
 be seen in this view. A solution similar to the one represented in the first [exemplary]
 embodiment [could] ^{can} also be used with such a design of the spring element, or the coupling
 element 124, 127. It [would be] ^{is} possible [here, too] to provide the cap 2 with a receiving slit,
 into which the coupling element 127 [could] ^{can} be pushed and wherein a correspondingly shaped
 recess in the casing wall [would have to be] ^{is} provided, which would correspond to the course
 of the upper film hinge 126.

But a completely different solution is shown here. Fig. 7 shows a cap 2, [whose] ^{where the} casing wall 20 has a recess 120, [which] extends over practically the entire height. In its size,
 the [this] recess 120 corresponds to the material strip 100, so that in the assembled state the
 material strip 100 can cover the recess 120 exactly in an interlocking manner. On the
 underside of the cover surface 121 of the cap 2, four support ribs 122, which can have
 additional interlocking means 123, are formed directly bordering the opening 120. These
 support ribs 123 are used for receiving two corresponding support ribs 128 between each
 other in an interlocking or frictionally connected manner.

The assembled entire closure 3 ^{is shown} can be seen in Fig. 8. This closure [also hardly differs from] ^{is somewhat similar to} a conventional single-piece closure. Only the separating lines between the material strip 100 of the casing wall 20 in the cap 2 extend further upward which, for all practical purposes, cannot be detected by a layman. In connection with this embodiment [variation] and in contrast to plastic closures produced in one piece, the security strip can also extend not only by approximately 180° around the closure, but for all practical purposes entirely around it, with only a cutout in the area of the hinge.

The lower part 1 is [again] represented in a lateral view, but rotated by 90° [in] with respect to Fig. 6. In contrast to the previously represented solution, with this [variation] the spring element and the coupling element 124, 127 would not be injected in the vertically extending position as shown in Fig. 6, but in a position as [represented] in Fig. 9. [For one, this] This provides greater [design] freedom [of design] and also makes it possible to form the support ribs 128 without [the necessity of having] gate valves in the mold.

In the second embodiment in accordance with Figs. 6 to 9, no pouring spout can be seen. However, ^{is shown} the pouring spout ^{can} be provided the same as in the previously mentioned embodiment. Accordingly, a corresponding sealing plug can also be provided in the cap 2. However, to include these elements in the drawing would clutter it ^{up} too much without offering any additional information. ^{But these} elements ^{, but the} ^{can} ^{will} be provided ^{in spite of this}. This in particular, because these elements play a corresponding part during assembly.

Although the two parts of the closure are individually produced and ~~(now)~~ must be assembled, in comparison to known plastic closures of similar construction they are considerably cheaper ~~(on account)~~ ^{because} of the enormously increased productivity when manufacturing the individual parts. As ~~(already)~~ ^{previously} mentioned ~~(at the outset)~~, this productivity is the result of the selected shape and the design of the snap hinge closure from two parts.

A solution for a two-part closure 3 which ~~(has been)~~ ^{is} optimized ~~(in)~~ ^{with} respect to production techniques, is represented in Fig. 10 in detail in a centered vertical section. Here, ~~(the)~~ at least one spring element 24 ~~(has been)~~ ^{is} attached, running in the extension of the casing wall 20 of the cap 2, by ~~(means of)~~ at least one film hinge 25. But ~~(in this case)~~ the coupling element 27 ~~(has been)~~ ^{is} designed ~~(in such a way)~~ ^{so} that it ~~(constitutes)~~ ^{forms} at least one part of the casing wall 10 of the lower part 1 and ~~(thanks to)~~ ^{with} a centering lip 18 for exact positioning, can be ~~(put)~~ ^{assembled} flush ~~(together with it)~~.

Moreover, a rib, which is oriented approximately radially outward, is provided ~~(there)~~ as a pressing element 19 in the interior chamber of the lower element 1. ~~(This)~~ ^{The} pressing element 19 works together with a retaining projection 19', which extends through at least one window 29 on the coupling element 27. The pressing element 19 makes it impossible to pull the retaining projections 19' out of the window 29, ~~(so that)~~ ^{to provide} a frictionally connected and interlocking connection between the lower part 1 and the cap 2 ~~(is assured)~~.

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A recessed grip 17 ^{is} [has been] formed in the casing wall 10 of the lower part 10 opposite the hinge.

A further preferred embodiment ^{of this invention} is represented in Figs. 11 to 14. This embodiment results in a particularly compact solution, [which is [also particularly] unproblematic in regard to assembly, because the two parts can be plugged vertically together in any arbitrary angle position. This results in a particularly cost-effective assembly, because an appropriate alignment is not necessary and the individual parts have no ^{asymmetrically} [asymmetrically] projecting parts which could lead to a hang-up ^{when manufacturing}.

The cap by itself is represented in Fig. 11 in a diametrical vertical section. The cap has a cylindrical casing wall 20 with a spring element 204 designed as a snap hinge. This snap hinge [204] has a film hinge 201, ^{forms} which [constitutes] the articulated connection between the spring element 204 and the casing wall 20 of the cap or upper part 2, and a second ^{forms} [lower film hinge 202] which [constitutes] the articulated connection between the spring element 204 and the coupling element 207 adjoining it on the bottom. Accordingly, the snap hinge 200 is ^{formed} [constituted] by the elements 201, 202 and 204. The snap hinge 200 is bordered in the radial direction by slits 203. The coupling element 270 has a closed ring-shaped form and is connected directly flush under the casing wall 20 with the latter. Here, the coupling element 270 is formed on the [said] casing wall 20 not only by means of the snap hinge 200, but also [additionally] by a tear seam 217. The tear seam 217 extends from the one lateral border of

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the snap hinge, extending around it, to the other lateral border 203 of the snap hinge 200 and terminates in the respective slits 203. After cutting the tear seam 217, the coupling element 270 is only connected with the casing wall 20 of the upper part 2 by the spring element 204, the same as in the previously described solutions. The tear seam²¹⁷ can be embodied as a continuous thin place or, as known in technology, as a predetermined separating place by [means of] ^{using} appropriate webs. In the form represented here, the tear seam 271 is represented as a continuous thin place. The lower edge of the casing wall 20 is formed by a pressure bead 205, which projects in an outward direction peripherally circulating. At the first use, the pressure by the user on the pressure bead 205 leads to the severing of the tear seam 271. Two inward projecting retaining beads 206 designed with sharp edges are formed on the inner surface of the circumferential coupling element 270, which are used for the interlocking connection with the embodiment of the lower part 1 represented in Fig. 12. Here, too, the cap 2 [is provided with] ^{has} a sealing plug 33, which has a circumferential sealing bead 34.

In this embodiment the lower part 1 also has a circumferential casing wall 10, whose ^{with an} upper area 210 [has been] offset toward the interior by approximately the casing wall thickness. Ring-shaped circumferential retaining notches [have been] ^{are} formed on the exterior surface of ^{the} [this] area 21', into which the retaining beads 206 snap in an interlocking manner, in the assembled state of the closure. A security strip 400 [has here been] ^{is} formed on the shoulder 212 formed in the transition area of the casing wall 10 to the inwardly offset upper

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area 210. [Here, too, the] ^{The} attachment can be embodied as a tear seam 401 or as a predetermined breaking point by [means of] ^{using} appropriate bridges, which can be cut. The upper edge of the security strip 400 is formed, projecting toward the interior, as a retaining lip 402.

^{The} [This] retaining lip 402 is located above the cover surface 21, through which a spout 12 extends [here, too]. In the closed state, the sealing bead 34 of the previously described sealing plug 33 comes to rest sealingly in the mouth area of the pouring spout 12. An annular wall 16 on the underside of the cover surface 11 is used as a seal against the bottle neck on which the closure is to be placed. A screw thread or, as represented here, a number of holding nubs 17, can be [provided] ^{used} for fastening on the container neck.

The closure 3 is represented assembled in Figs. 13 and 14. The actual connection between the lower part 1 and the cap, or upper part 2, is practically not visible, because this area is completely covered by the security strip 400. The tongue 403 of the security strip 400 is visible in Fig. 13, while in the position in accordance with Fig. 14, rotated by 180°, the security strip 400 extends continuously. The retaining lip 402 on the security strip 400 covers the pressure bead 205, which [therefore] is not visible. Only a short section of the pressure bead 205 [can be seen] ^{is shown} in the separation area of the tongue 403. The embodiment represented here has many advantages. In regard to production technology and assembly technology it is the version which can be produced best and assembled best. [Added

Also, there is a double security feature, because it is necessary prior to the first opening to remove the security strip 400 first, and thereafter also to sever the tear seam 271.

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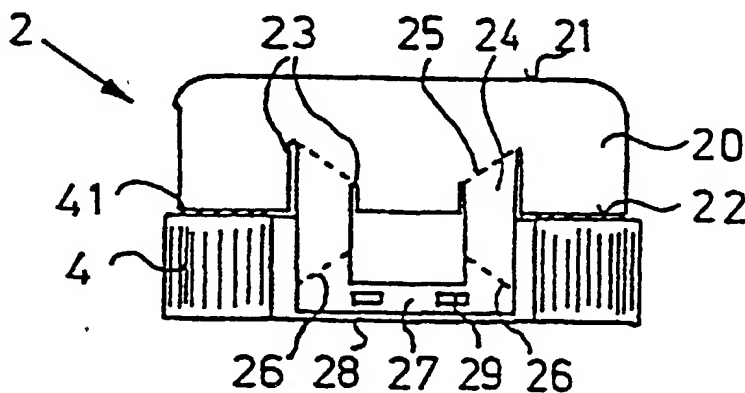
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[Fortsetzung auf der nächsten Seite]

(54) Title: TWO-PART PLASTIC SNAP HINGE CLOSURE

(54) Bezeichnung: ZWEIFTEILIGER SCHNAPPSCHARNIERVERSCHLUSS AUS KUNSTSTOFF



(57) Abstract: The invention relates to a two-part hinge closure (3) comprised of a lower part (1) which has a surrounding outer wall (10) and which can be placed on a container, and is comprised of a cap (2) which has an outer wall and which can be joined to the lower part in a hinged manner. The lower part (1) and the cap (2) are separately produced and can be assembled together. In an assembled and closed state, the outer walls (10, 20) are situated one above the other in an aligned manner at least in the hinge area of both hinge closure parts (1, 2). Both parts (1, 2) can be joined to one another by a snap hinge comprised of at least one spring element (24, 124, 204) and of at least one coupling piece (27, 127, 270). When the

closure (3) is in a closed state, the at least one spring element (24, 124, 204) and the at least one coupling piece (27, 127, 270) are at least almost aligned with the outer wall (10, 20) of the closure part (1, 2) on which they are formed as one piece.

(57) Zusammenfassung: Es wird ein zweiteiliger Scharnierverschluss (3) bestehend aus einem auf einen Behälter aufsetzbaren Unterteil (1) mit umlaufender Mantelwand (10) und einem damit scharnierbeweglich verbindbaren Deckel (2) mit Mantelwand vorgeschlagen. Unterteil (1) und Deckel (2) sind je für sich gesondert hergestellt und zusammenmontierbar, wobei im montierten, geschlossenen Zustand die Mantelwände (10, 20) mindestens im Scharnierbereich beider Scharnierverschlusssteile (1, 2) fluchtend übereinander stehen. Die beiden Teile (1, 2) sind durch ein Schnappscharnier bestehend aus mindestens einem Federelement (24, 124, 204) und mindestens einem Kupplungsstück (27, 127, 270) miteinander verbindbar, wobei im geschlossenen Zustand des Verschlusses (3) das mindestens ein Federelement (24, 124, 204) und das mindestens ein Kupplungsstück (27, 127, 270) mit der Mantelwand (10, 20) des Verschlusssteiles (1, 2), an dem sie einstückig angeformt sind, mindestens annähernd fluchten.

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List of Reference Numerals

- 1 Lower part
- 2 Cap
- 3 Closure
- 4 Security strip
- 10 Casing wall
- 11 Cover surface
- 12 Pouring spout
- 13 Retaining bead
- 14 Recess in the lower part
- 15 Cam
- 16 Receiving slit
- 17 Holding nubs
- 18 Centering lip
- 19 Pressing element
- 19' Retaining projection
- 20 Casing wall of the cap
- 21 Cover surface

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The present invention relates to a two-part hinge closure, consisting of a lower part, which can be placed on a container and has a circumferential casing wall and a cap, which can be connected with it by means of a movable hinge and has a casing wall, wherein both parts are made separately of each other and can be assembled together, and wherein furthermore in the assembled, closed state the casing walls of both hinge parts extend flush above each other.

Hinge closures made of plastic have been on the market for approximately forty years. In the simplest forms, such hinge closures made of plastic consist of a lower part and a cap, wherein the lower part and the cap are connected as one piece by means of a film hinge. In most cases these are not snap hinge closures. These came on the market in large numbers only approximately ten years later. In the meantime the various embodiments of plastic closures with snap hinges have practically conquered the entire hinge closure field.

The designs for plastic closures with snap hinges have become more and more complicated these days. The production of plastic snap hinge closures becomes more and more complex and expensive because of the additional integration of a security strip. The plastic snap hinge closures are single-piece and usually are loaded from the direction of the lower part during injection molding. The entire material must be pressed from the injection location through the lower part, and thereafter via at least one film hinge into the cap, and the latter must be loaded. If there is a security strip in addition, it is also necessary to load it with material via very thin connecting points. This leads

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to the cycle times for injection molding and closing of such plastic parts hardly permitting cycle times below twenty seconds, even with the most modern machinery and optimum design of the injection molds. Moreover, the respective closures injection-molded in the open state entail more problems during ejection. Often the security strips, or also the spring elements which cause the snap action of the snap hinge, already become damaged during ejection from the injection mold.

Two-part plastic closures have also been known for some years. Here, the productions as two parts has different reasons, but they are always connected directly or indirectly with the hinge. For example, it has been long known that the sturdiness of the hinges of single-piece snap hinge closures is relatively low and they tend to tear because of the forces which are introduced in a disadvantageous manner into the film hinges. Accordingly, it is proposed in EP-A-0 629 560 to produce the lower part and the cap of a snap hinge closure separately and to manufacture a separate hinge element, with which the two closure parts can be connected with each other, from a rubber-like plastic material.

US-A-5,381,920 also shows a similar solution, wherein a tool box made of plastic is manufactured from a separate lid and a separate lower part, wherein a pure hinge element can be inserted into appropriate receivers of both parts and in this way hingedly connects the two parts.

A single-piece plastic closure is known from DE-A-195 17 102, wherein the spring element of the snap hinge is separately made. This permits the production of a closure with a spring force of the closure specified by the customer, wherein it is simultaneously possible to work with a considerably simpler

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injection molding machine it is practically possible to produce approximately three to ten times more two-part plastic hinge closures than single-piece snap hinge closures with the customary technology. Although such a manufacture demands an additional assembly machine, it is known from analogous uses that the capacity of such assembly machines is enormously great, so that it is possible to easily process the production capacity from two plastic injection molding machines with one assembly machine and with the technology represented here.

In addition to the purely economic advantages, a plastic closure produced in two parts offers still further advantages. The lower part and the upper part can of course be designed in different colors without problems. Furthermore, the cap and the lower part can also be manufactured from different plastic materials. In this way it is possible in particular to produce a hinge closure wherein the lower part can be made from PET. It is therefore possible to offer a snap hinge closure for PET containers which is also gas-tight. Up to now it had not been possible to produce plastic snap hinge closures from PET for reasons of process technology.

The present trend of continuously falling prices for plastic snap hinge closures practically does not permit the production of individual tools for small runs. On the other hand, customers desire the highest possible degree of customizing. These two requirements are completely opposed. However, thanks to the present invention this problem can be easily solved. The lower part and the cap can be practically combined in the manner of a construction kit. Thus it is possible to produce lower parts of the same diameter and different knurling, and it is possible

without enormous outlay to inject company marks by means of interchangeable inserts into the molds for the caps. Added to this are the already mentioned different color variations, which can be combined with each other in unlimited ways.

Thanks to the geometric arrangement of the snap hinge at one of the two closure parts and their special design, it is possible for the injection molds to have the required simplicity, and the corresponding simple assembly can also take place.

The present invention also discloses two preferred methods for assembling two embodiments in accordance with the invention of the subject of the invention.

Further advantageous embodiments of the subject of the invention ensue from the dependent claims and are explained in the following description.

Embodiments of the subject of the invention are represented by way of example in the assembled and unassembled states in the attached drawings.

Fig. 1 shows a lower closure part in the unassembled state in a lateral view in the direction toward the hinge area, while

Fig. 2 represent a matching cap with a security strip, also in the unassembled state in the same view. In

Fig. 3 the two closure parts in Figs. 1 and 2 are represented in the assembled state, wherein the viewing direction is the same as with the previously represented individual closure parts.

Fig. 4 shows a view from above on the lower closure part in Fig. 1, again in the unassembled state and

Fig. 5 shows the upper closure part, or the cap, in Fig. 2 in a plan view from below.

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Fig. 6 shows the lower part of a second closure variation, wherein the spring element and the coupling element are arranged in one piece on the lower part, the same as a security strip.

Fig. 7 shows the matching cap in the same lateral view as the lower part in Fig. 6, and

Fig. 8 shows the closure with the two closure parts in Figs. 6 and 7 in the assembled state. In

Fig. 9 the lower part in Fig. 6 is represented in a lateral view and rotated by 90° , wherein the spring element and the coupling element are shown practically pivoted downward by 180° , which corresponds to the manufacturing position.

Fig. 10 represents a center vertical section through an assembled two-part closure on an enlarged scale.

Fig. 11 represents a diametrical vertical section through a further embodiment of a cap, and

Fig. 12 the same section through a lower part matching the cap in Fig. 11.

Fig. 13 shows the assembled closure consisting of the lower part and the cap in Figs. 11 and 12 in a front view, and in

Fig. 14, in a rear view.

The closure in accordance with the invention consists of two individual parts which are separately produced. These are, on the one hand, the lower part 1 and, on the other hand, the upper part or cap 2. Only in the assembled state do these two closure parts 1, 2 result in the complete closure 3, as represented in Figs. 3, 8, 13 and 14. For the invention here disclosed, the presence of casing walls on the lower part 1, as well as on the cap 2, is absolutely necessary in order to obtain a closure which is simple to assemble, has no protruding elements and also meets

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all esthetic requirements. Protruding elements are always problematical for the entire handling during assembly, as well as for packaging the containers with the corresponding closures. Added to this is that protruding or strongly snapping elements can practically be produced only with appropriate gate valves which, on the one hand, make the tools complex and increase the cycling times. Accordingly, only the security strips of the closures in accordance with the invention slightly protrude in respect to the casing walls.

It is generally necessary for all embodiments that the casing walls of both closure parts be arranged so that they are flush above each other in the assembled state, however, this does not necessarily require that the casing walls extend vertically. It is sufficient that the casing walls of both parts are only flush with each other in the hinge area in the assembled state. This is not required in the remaining areas, so that complete freedom of design is maintained. In contrast to plastic closures produced in one piece, it is possible without problems by means of the technology in accordance with the invention to design closures which as a whole have a conical shape. A further general characteristic of the two-part closures in accordance with the invention lies in that for all practical purposes the basic arrangement of the parts constituting the hinge can be arranged in an arbitrarily interchanged manner. This means that with practically the same embodiment the respective spring elements, or the at least one spring element and the at least one coupling element, can be arranged either in the lower part 1 or on the cap 2, and correspondingly the receivers which are engaged by the parts of the coupling element can be attached to the respectively

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A cap 2 matching the lower part in Fig. 1 is shown in Fig. 2. In this embodiment a security strip 4 has been applied by injection molding to the cap 2. The cap 2 has a cover surface 21, which is adjoined by a circumferential casing wall 20. In the example here represented this casing wall 20 extends vertically in respect to the cover surface 21. However, as already mentioned, the casing wall could also extend inclined in respect to the cover surface 21, so that the entire cap has a conical shape. Of course this would require a corresponding shape of the lower part 1 and its casing walls 10. The security strip 4 is arranged on the lower edge 22 of the cap 2 via strips 41 which act as predetermined breaking points. Slits 23 can be seen, which are oriented upward from the lower cap edge and leave the spring elements 24 free, which are connected in one piece with the cap 2. The transition of the spring elements 24 to the casing wall 20 takes place via film hinges or thin places 25, which here extend obliquely. On their lower end the two spring elements 24 are connected with each other via a bridge-like coupling element 27. The transition from the coupling element 27 to the two spring elements 24 can also take place via film hinges 26.

Actually, the spring elements 24 are merely parts which transmit tensile forces, wherein the tensile forces result in an elastic bending deformation of adjoining areas of the casing walls 10, 20.

It can be practical for later assembly to extend the coupling element 27 exactly as far downward over the lower cap edge 22 as the lower edge of the security strip 4, so that a circumferential support surface is created for all practical purposes, which is particularly advantageous for later handling.

possible to first distinguish the cam 15, which is used as a stop for the cap edge during the opening, or closing, operation, after which an elongated receiving slit 16 can be distinguished, which is arranged further outward and extends concentrically in relation to the outer wall. This receiving slit extends through the cover surface 11 and can also be arranged to extend as a depression partially in the inner wall of the lower part 1. The receiving slit 16 communicates with the two laterally arranged recesses 14, in which the spring elements 24, in this case two strap retainers, come to rest in the assembled state. The required free mobility of the spring elements 24 is provided thanks to the adaptation of the shape of these recesses 14. The casing wall 10 of the lower part 1 remains standing between the two recesses 14.

Fig. 5 shows a plan view of the cap 2 from below. A sealing plug 33 is arranged centered in the cover surface 21 of the cap 2, which can extend sealingly around the pouring spout 12. The security strip 4 extends around the casing wall 20, offset radially outward from it. The connection between the casing wall 20 and the security strip 4 is provided via webs 41. In this view the coupling element 27 appears to be like a thinned wall area. The normal wall thickness shows the center area 35, which constitutes the casing wall area left free. Here, too, the cap again makes a transition into full wall strength at the end of the spring elements, of course, the outer casing wall line is only shown in dashed lines for clarity in order to show the differences in wall thickness between the casing wall on the one hand and the spring elements 24 and the coupling element 26 on the other hand.

A second variation of the two-part plastic closure in accordance with the invention is represented in Figs. 6 to 9.

Here, too, the lower part has been identified by 1, the cap by 2 and the entire closure by 3. The reference numeral 4 has again been selected for the security strip, and 41 also means the connecting webs 41 here, with which the security strip is fastened, in this case on the lower part 1.

The lower part 1 in Fig. 6 here again has a circular-cylindrical casing wall 10. A vertically raised material strip 100 extends flush with this outer surface of the casing wall and comprises a snap hinge 103 having a center area 124, which has a function corresponding to the spring element 24 in the previous embodiment. Here, the transition of this spring element 124 to the lower part 1, or to the casing wall 10 of the latter, takes place via a film hinge 125 extending in an arc. A diametrically opposed film hinge 126 constitutes the line of separation between the spring element 124 and the coupling element 127 following it. Both film hinges 125 and 126 are shown in dashed lines, since they can hardly be seen in this view. A solution similar to the one represented in the first exemplary embodiment could also be used with such a design of the spring element, or the coupling element 124, 127. It would be possible here, too, to provide the cap 2 with a receiving slit, into which the coupling element 127 could be pushed and wherein a correspondingly shaped recess in the casing wall would have to be provided, which would correspond to the course of the upper film hinge 126.

But a completely different solution is shown here. Fig. 7 shows a cap 2, whose casing wall 20 has a recess 120, which extends over practically the entire height. In its size, this recess 120 corresponds to the material strip 100, so that in the assembled state the material strip 100 can cover the recess 120

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the cap 2 is assured.

A recessed grip 17 has been formed in the casing wall 10 of the lower part 10 opposite the hinge.

A further preferred embodiment is represented in Figs. 11 to 14. This embodiment results in a particularly compact solution, which is also particularly unproblematic in regard to assembly, because the two parts can be plugged vertically together in any arbitrary angle position. This results in a particularly cost-effective assembly, because an appropriate alignment is not necessary and the individual parts have no asymmetrically projecting parts which could lead to a hang-up.

The cap by itself is represented in Fig. 11 in a diametrical vertical section. The cap has a cylindrical casing wall 20 with a spring element 204 designed as a snap hinge. This snap hinge 204 has a film hinge 201, which constitutes the articulated connection between the spring element 204 and the casing wall 20 of the cap or upper part 2, and a second, lower film hinge 202, which constitutes the articulated connection between the spring element 204 and the coupling element 207 adjoining it on the bottom. Accordingly, the snap hinge 200 is constituted by the elements 201, 202 and 204. The snap hinge 200 is bordered in the radial direction by slits 203. The coupling element 270 has a closed ring-shaped form and is connected directly flush under the casing wall 20 with the latter. Here, the coupling element 270 is formed on the said casing wall 20 not only by means of the snap hinge 200, but also additionally by a tear seam 217. The tear seam 217 extends from the one lateral border of the snap hinge, extending around it, to the other lateral border 203 of the snap hinge 200 and terminates in the

respective slits 203. After cutting the tear seam 217, the coupling element 270 is only connected with the casing wall 20 of the upper part 2 by the spring element 204, the same as in the previously described solutions. The tear seam can be embodied as a continuous thin place or, as known in technology, as a predetermined separating place by means of appropriate webs. In the form represented here, the tear seam 271 is represented as a continuous thin place. The lower edge of the casing wall 20 is formed by a pressure bead 205, which projects in an outward direction peripherally circulating. At the first use, the pressure by the user on the pressure bead 205 leads to the severing of the tear seam 271. Two inward projecting retaining beads 206 designed with sharp edges are formed on the inner surface of the circumferential coupling element 270, which are used for the interlocking connection with the embodiment of the lower part 1 represented in Fig. 12. Here, too, the cap 2 is provided with a sealing plug 33, which has a circumferential sealing bead 34.

In this embodiment the lower part 1 also has a circumferential casing wall 10, whose upper area 210 has been offset toward the interior by approximately the casing wall thickness. Ring-shaped circumferential retaining notches have been formed on the exterior surface of this area 21', into which the retaining beads 206 snap in an interlocking manner in the assembled state of the closure. A security strip 400 has here been formed on the shoulder 212 formed in the transition area of the casing wall 10 to the inwardly offset upper area 210. Here, too, the attachment can be embodied as a tear seam 401 or as a predetermined breaking point by means of appropriate bridges,

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which can be cut. The upper edge of the security strip 400 is formed, projecting toward the interior, as a retaining lip 402. This retaining lip 402 is located above the cover surface 21, through which a spout 12 extends here, too. In the closed state, the sealing bead 34 of the previously described sealing plug 33 comes to rest sealingly in the mouth area of the pouring spout 12. An annular wall 16 on the underside of the cover surface 11 is used as a seal against the bottle neck on which the closure is to be placed. A screw thread or, as represented here, a number of holding nubs 17, can be provided for fastening on the container neck.

The closure 3 is represented assembled in Figs. 13 and 14. The actual connection between the lower part 1 and the cap, or upper part 2, is practically not visible, because this area is completely covered by the security strip 400. The tongue 403 of the security strip 400 is visible in Fig. 13, while in the position in accordance with Fig. 14, rotated by 180°, the security strip 400 extends continuously. The retaining lip 402 on the security strip 400 covers the pressure bead 205, which therefore is not visible. Only a short section of the pressure bead 205 can be seen in the separation area of the tongue 403. The embodiment represented here has many advantages. In regard to production technology and assembly technology it is the version which can be produced best and assembled best. Added to this is a double security, because it is necessary prior to the first opening to remove the security strip 400 first, and thereafter also to the sever the tear seam 271.

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List of Reference Numerals

- 1 Lower part
- 2 Cap
- 3 Closure
- 4 Security strip
- 10 Casing wall
- 11 Cover surface
- 12 Pouring spout
- 13 Retaining bead
- 14 Recess in the lower part
- 15 Cam
- 16 Receiving slit
- 17 Holding nubs
- 18 Centering lip
- 19 Pressing element
- 19' Retaining projection
- 20 Casing wall of the cap
- 21 Cover surface
- 22 Lower cap edge
- 23 Slits
- 24 Spring elements
- 25 Thin places
- 26 Film hinge
- 27 Coupling element
- 28 Sharp-edged bead
- 29 Window
- 33 Sealing peg

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- 34 Sealing bead
- 35 Casing wall area
- 41 Connecting webs
- 100 Stacked material strips
- 120 Recess
- 121 Cover surface
- 122 Support ribs
- 123 Interlocking means
- 124 Area as a spring element
- 125 Film hinge
- 126 Film hinge
- 127 Coupling element
- 128 Support ribs
- 200 Snap hinge
- 201 Film hinge
- 202 Film hinge
- 203 Slits, lateral border
- 204 Spring element
- 205 Pressure bead
- 206 Retaining beads
- 210 Upper area of the wall area 10
- 211 Retaining notches
- 212 Shoulder
- 270 Coupling element
- 271 Tear seam
- 400 Security strip
- 401 Tear seam
- 402 Retaining lip

Claims

1. A two-part hinge closure (3), consisting of a lower part (1), which can be placed on a container and has a circumferential casing wall (10) and a cap (2), which can be connected with it by means of a movable hinge and has a casing wall, wherein both parts are made separately of each other and can be assembled together, and wherein furthermore in the assembled, closed state the casing walls (10, 20) of both hinge closure parts (1, 2) extend flush above each other, characterized in that the two parts (1, 2) can be connected with each other by a snap hinge, consisting of at least one spring element (24, 124, 204) and at least one coupling element (27, 127, 270), wherein in the closed state of the closure (3) the at least one spring element (24, 124, 204) and the at least one coupling element (27, 127, 270) are at least approximately flush with the casing wall (10, 20) of the closure part (1, 2) on which they have been formed in one piece.

2. The two-part hinge closure in accordance with claim 1, characterized in that the lower part (1) has at least one pouring spout (12) or pouring opening, and the cap (2) is provided with a sealing element (33), which sealingly acts together with the at least one pouring spout or pouring opening in an interlocking manner.

3. The two-part hinge closure in accordance with claim 1, characterized in that the at least one spring element consists of two strap retainers (24), wherein the ends of the strap retainers

(24), which project away from the closure part on which they have been injection-molded, are connected with each other via the coupling element (27).

4. The two-part hinge closure in accordance with claim 1, characterized in that the at least one spring element (124, 204) includes a snap hinge (101, 200), which is bordered by two curved film hinges, which approach each other in their course and then move away again, wherein the one film hinge (125, 202) constitutes the connection with the closure part (2), to which the spring element has been injection-molded, and the other film hinge (126, 204) constitutes the connection with the coupling element (127, 270).

5. The two-part hinge closure in accordance with claim 4, characterized in that the spring element (124) which includes the snap hinge (101) is a flexible material strip (100), on whose extension the coupling element (127) is formed.

6. The two-part hinge closure in accordance with claim 5, characterized in that a concentric receiving slit (16), which is offset toward the center by the thickness of the casing, is provided on the closure part (1, 2), in which the coupling element, which is fixedly connected with the other closure part (1, 2) is received in an interlocking and/or frictionally connected manner.

7. The two-part hinge closure in accordance with claim 6, characterized in that the closure part (1, 2) with the receiving

slit (16) in the casing wall has at least one recess (14), which secures the free mobility of the at least one spring element (24, 124) during the opening and closing movement.

8. The two-part hinge closure in accordance with claim 5, characterized in that at least one rib (128), which can be connected in a snapped-in fashion with ribs (122) of the same kind on the other closure part, is provided on that coupling element (127) which is connected in one piece with the closure part (1, 2).

9. The two-part hinge closure in accordance with claim 1, characterized in that a security strip (4) is also injection-molded to that closure part (1, 2) on which the at least one spring element (24, 124) and the coupling element (27, 127) are arranged.

10. The two-part hinge closure in accordance with claim 9, characterized in that the coupling element (27, 127) and the security strip (4) extend at least by the same amount above the casing wall edge of the closure part (1, 2) on which they are arranged.

11. The two-part hinge closure in accordance with claim 5, characterized in that on one closure part the circumferential casing wall (10, 20) has a recess (120) which has at least the shape and size of the material strip (100) which has been injection-molded on the other closure part.

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23. The two-part hinge closure in accordance with claim 22, characterized in that the cap (2) has a pressure bead (205) on the lower edge of the casing wall (20), which is interlockingly held by the retaining lip (402).

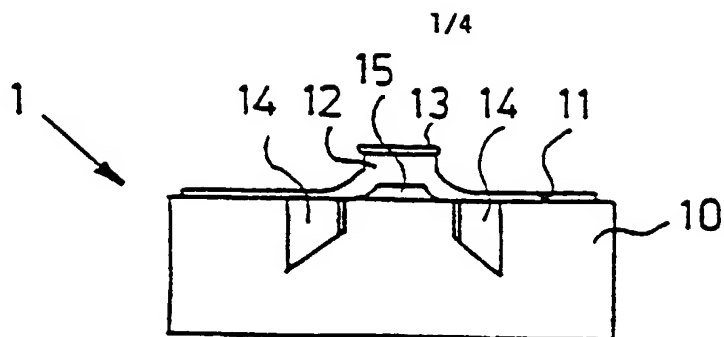


FIG. 1

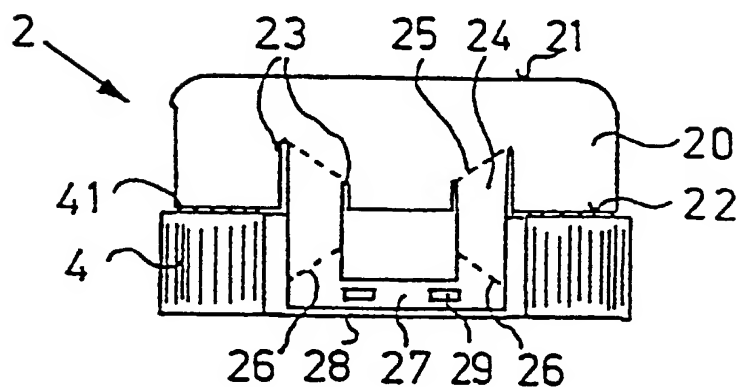


FIG. 2

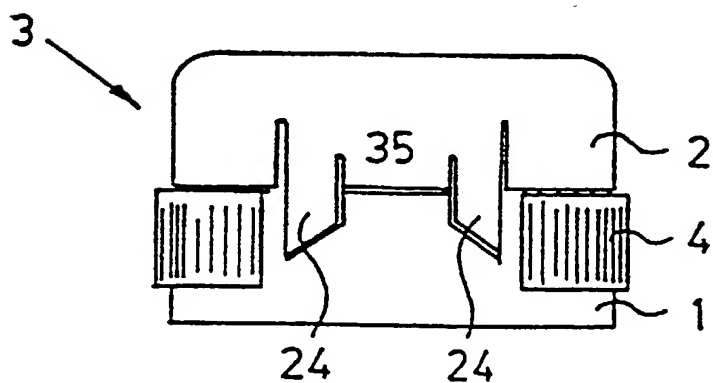
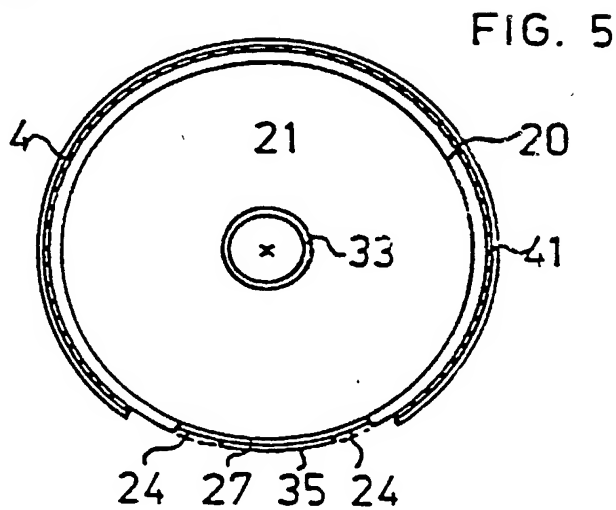
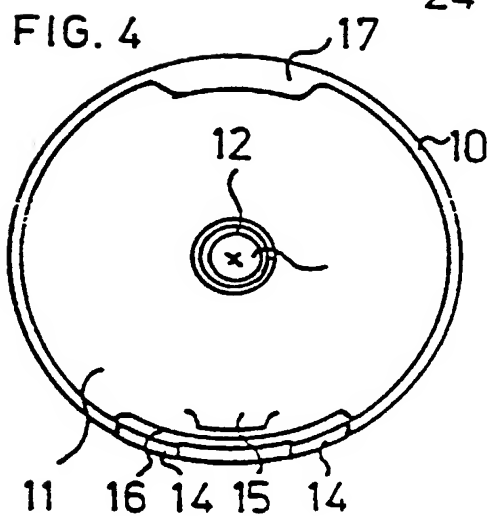


FIG. 3



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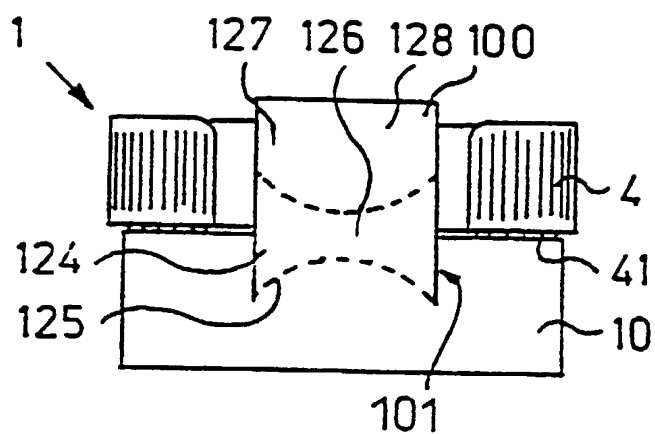


FIG. 6

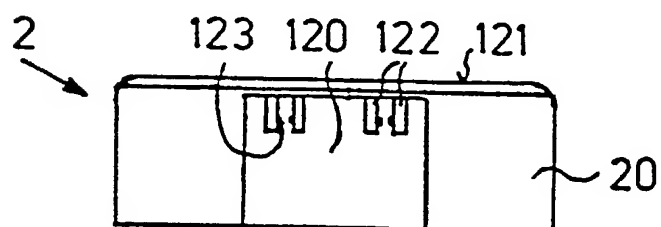


FIG. 7

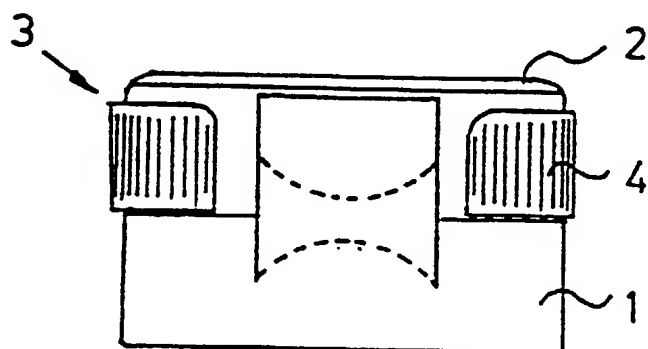


FIG. 8

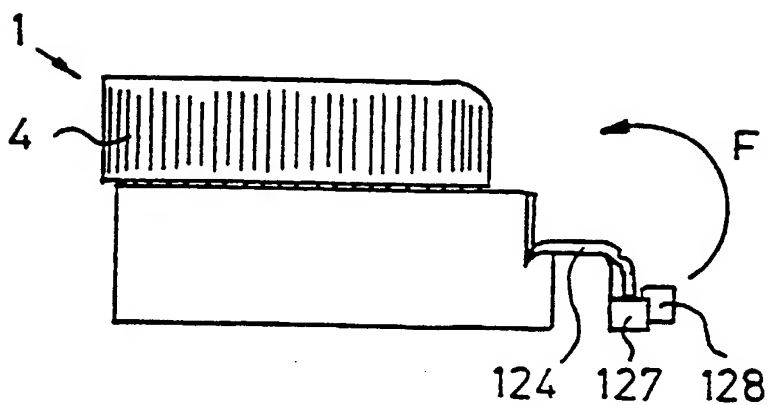
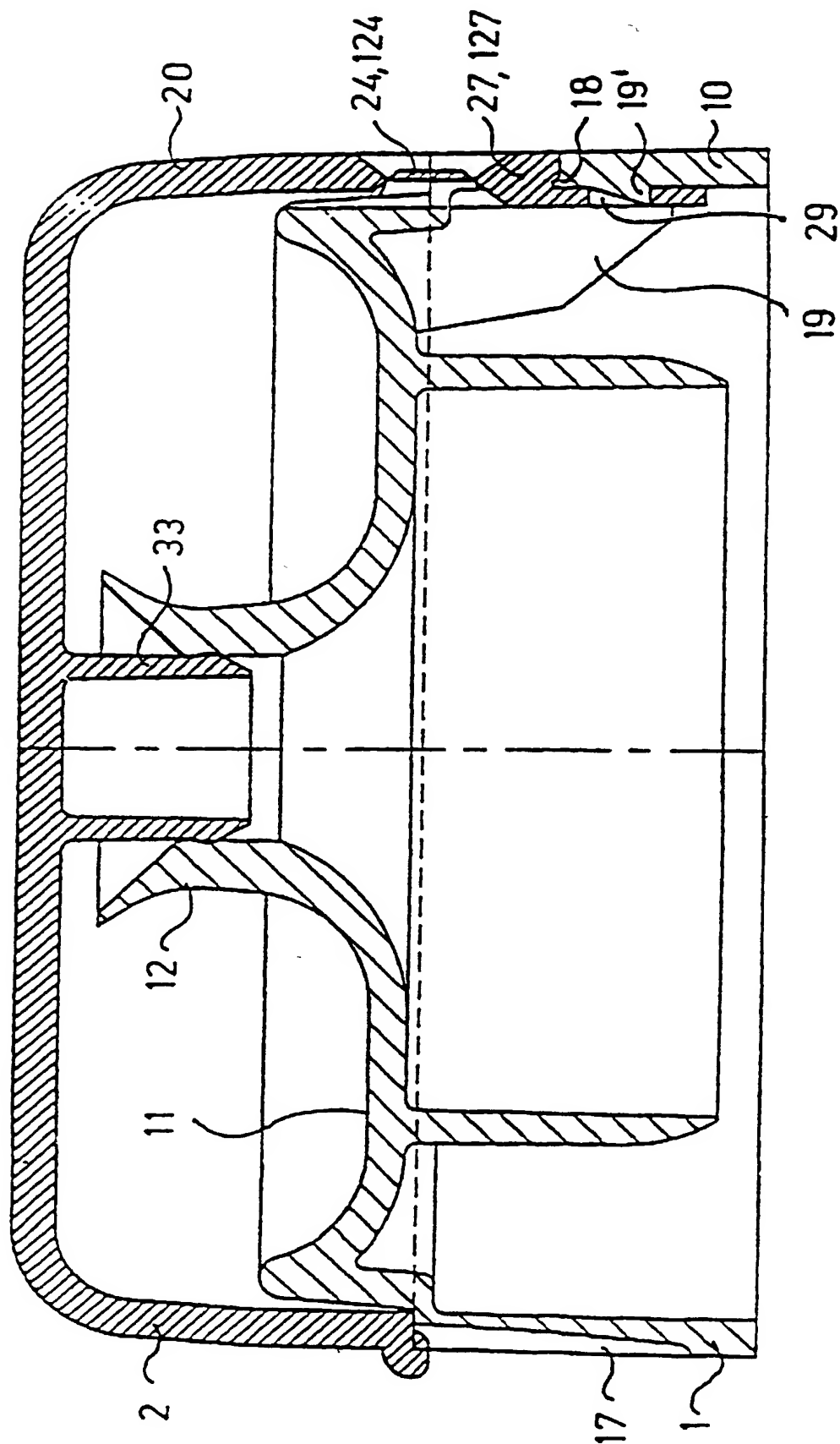


FIG. 9

FIG. 10



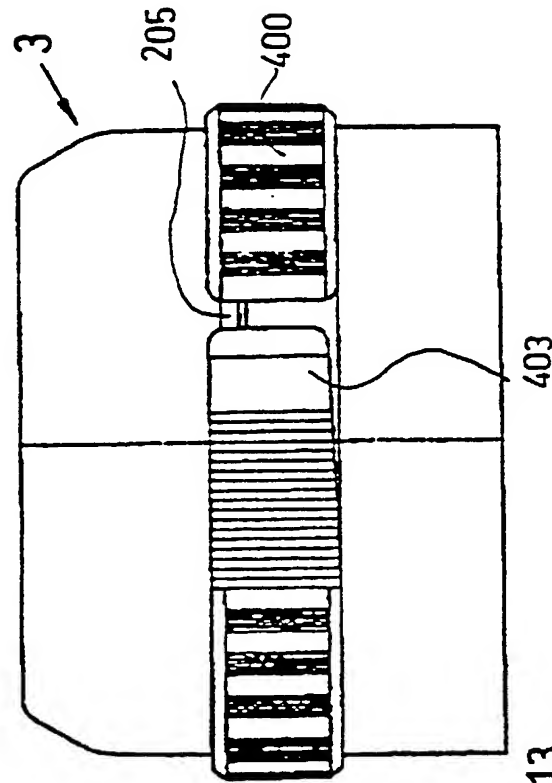


FIG. 13

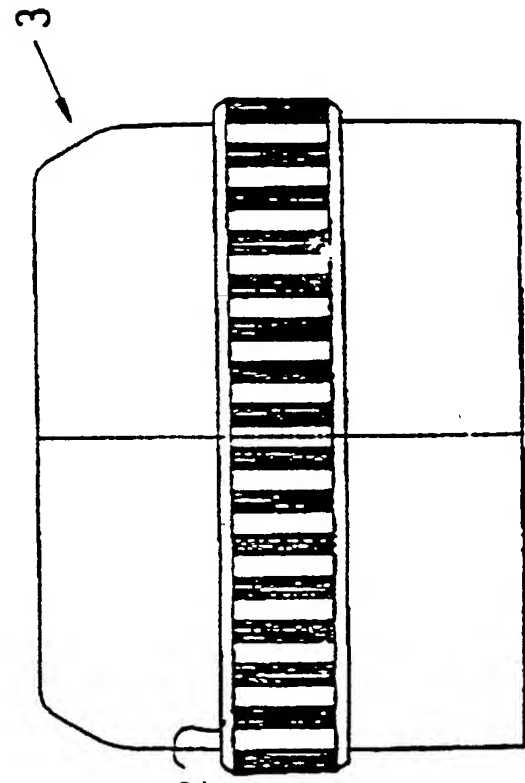


FIG. 14

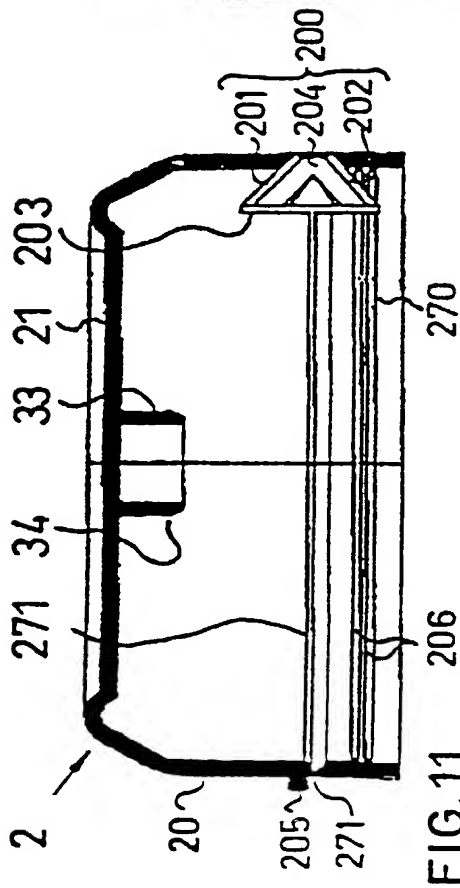


FIG. 11

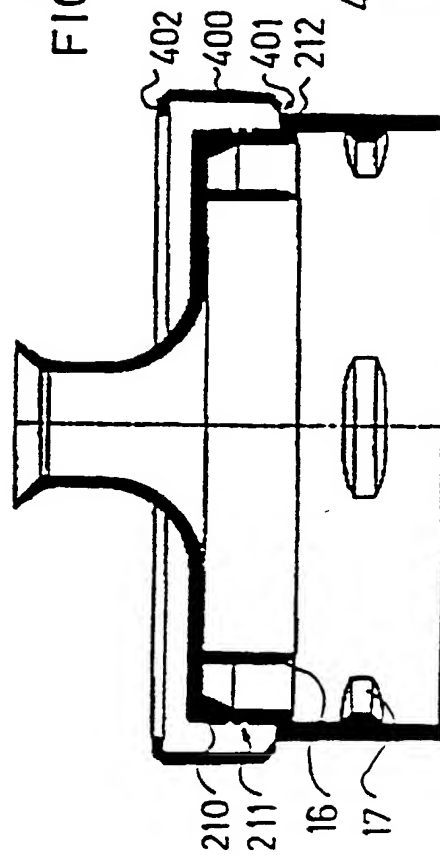


FIG. 12

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BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a two-part hinge closure, having a lower part, which can be placed on a container, and having a circumferential casing wall, and a cap, which can be connected with the lower part by a movable hinge and having a casing wall. Both parts are made separately of each other and can be assembled together, and in an assembled, closed state the casing walls of both hinge parts extend flush above each other.

Description of Related Art

Hinge closures made of plastic have been on the market for approximately forty years. In the simplest forms, such hinge closures made of plastic consist of a lower part and a cap, wherein the lower part and the cap are connected as one piece by a film hinge. In most cases these are not snap hinge closures. These closures came on the market in large numbers only approximately ten years later. In the meantime the various embodiments of plastic closures with snap hinges overwhelm the entire hinge closure field.

The designs for plastic closures with snap hinges have become more and more complicated. The production of plastic snap hinge closures becomes more and more complex and expensive because of the additional integration of a security strip. The plastic snap hinge closures are a single-piece and usually are loaded from the direction of the lower part during injection molding. The entire material must be

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pressed from the injection location through the lower part, and thereafter via at least one film hinge into the cap, and the lower part must be loaded. If there is also a security strip, it is necessary to load it with material via very thin connecting points. This leads to the cycle times for injection molding and closing of such plastic parts hardly permitting cycle times below twenty seconds, even with the most modern machinery and optimum design of the injection molds. Also, the respective closures injection-molded in the open state have more problems during ejection. Often the security strips, or also the spring elements which cause the snap action of the snap hinge, become damaged during ejection from the injection mold.

Two-part plastic closures have also been known. Here, the productions as two parts has different reasons, but they are always connected directly or indirectly with the hinge. For example, it is known that the sturdiness of the hinges of single-piece snap hinge closures is relatively low and they tend to tear because of the forces which are introduced in a disadvantageous manner into the film hinges.

Accordingly, it is proposed in European Patent Reference EP-A-0 629 560 to produce the lower part and the cap of a snap hinge closure separately and to manufacture a separate hinge element, with which the two closure parts can be connected with each other, from a rubber-like plastic material.

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U.S. Patent 5,381,920 also shows a similar solution, wherein a tool box made of plastic is manufactured from a separate lid and a separate lower part, wherein a pure hinge element can be inserted into appropriate receivers of both parts and thus hingedly connect the two parts.

A single-piece plastic closure is known from German Patent Reference DE-A-195 17 102, wherein the spring element of the snap hinge is separately made. This permits the production of a closure with a spring force of the closure specified by the customer, wherein it is simultaneously possible to work with a considerably simpler injection mold permitting higher cycling times.

True two-part closures are known from German Patent Reference DE-A-37 03 193, as well as European Patent Reference EP-A-0 583 204. In both cases these are not snap hinge closures, but only hinge closures. These closures are made in two pieces because they are relatively large closures, which are intended for long-term use. Accordingly it is desirable, for example, that such closures can also be disassembled again for cleaning, in order to be able to reassemble them later in a clean state for continued use.

SUMMARY OF THE INVENTION

In this regard, this invention has a completely different object. Longevity is of no real interest, but rather the cheapest possible production. Thus it is intended to prevent large amounts of plastic material from having to flow over thin places, for example film hinges.

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This object is attained with a two-part design of a hinge closure having characteristics described in this specification and in the claims.

With the two-part design, the amount of plastic per closure part is reduced to approximately half that of a single-piece closure. Thus plastic parts are simplified and reduced and it is possible to operate with much shorter cycle times. In particular, cycle times between four and eight seconds are possible. Also, with the smaller parts it is possible to arrange nearly twice as many cavities per injection mold. The relatively simple and small plastic parts make it also possible to operate with so-called tier tools without any special cost outlay, which multiply the capacity as a function of the number of tiers. This means that with the same plastic injection molding machine it is practically possible to produce approximately three to ten times more two-part plastic hinge closures than single-piece snap hinge closures with the customary technology. Although such a manufacture demands an additional assembly machine, it is known from analogous uses that the capacity of such assembly machines is enormously great. Thus, it is possible to easily process the production capacity from two plastic injection molding machines with one assembly machine and with the technology represented here.

In addition to the purely economic advantages, a plastic closure produced in two parts offers further advantages. The lower part and the upper part can be designed in different colors without problems. Furthermore, the cap and the lower part can also be manufactured from different plastic materials. Thus, it is

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possible in particular to produce a hinge closure wherein the lower part can be made from PET. It is possible to offer a snap hinge closure for PET containers which is also gas-tight. It is now possible to produce plastic snap hinge closures from PET, for reasons of process technology.

The present trend of continuously falling prices for plastic snap hinge closures practically does not permit the production of individual tools for small runs. On the other hand, customers desire the highest possible degree of customizing. These two requirements are completely opposed. However, with this invention, this problem can be easily solved. The lower part and the cap can be practically combined in the manner of a construction kit. Thus it is possible to produce lower parts of the same diameter and different knurling, and it is possible without a large cost outlay to inject company marks by using interchangeable inserts into the molds for the caps. Also, the already mentioned different color variations, which can be combined with each other in unlimited ways.

With the geometric arrangement of the snap hinge at one of the two closure parts and their special design, it is possible for the injection molds to have the required simplicity, and the corresponding simple assembly can also occur.

This invention also discloses two preferred methods for assembling two embodiments in accordance with this invention.

Further advantageous embodiments of the subject of this invention are determined from the dependent claims and are explained in the following description.

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BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of this invention are represented in the assembled and unassembled states in the attached drawings, wherein:

Fig. 1 shows a lateral view of a lower closure part in an unassembled state, in a direction toward the hinge area;

Fig. 2 shows a lateral view of a matching cap with a security strip, also in an unassembled state;

Fig. 3 shows a lateral view of the two closure parts in an assembled state, viewed in a direction the same as the previously represented individual closure parts;

Fig. 4 shows a top view of the lower closure part shown in Fig. 1, in the unassembled state;

Fig. 5 shows a bottom view of the upper closure part, or the cap, shown in Fig. 2;

Fig. 6 shows the lower part of a second closure, wherein a spring element and the coupling element are arranged in one piece on a lower part, the same as a security strip;

Fig. 7 shows a lateral view of the matching cap, in the same direction as the lower part in Fig. 6;

Fig. 8 shows the closure with the two closure parts shown in Figs. 6 and 7, but in an assembled state;

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Fig. 9 shows the lower part shown in Fig. 6 but in a lateral view and rotated by 90° , wherein the spring element and the coupling element are shown pivoted downward by practically 180° , which corresponds to a manufacturing position;

Fig. 10 shows a center vertical section taken through an assembled two-part closure on an enlarged scale;

Fig. 11 shows a diametrical vertical section taken through a further embodiment of a cap;

Fig. 12 shows a similar section taken through a lower part matching the cap shown in Fig. 11;

Fig. 13 shows an assembled closure with the lower part and the cap in Figs. 11 and 12 in a front view; and

Fig. 14 shows a rear view of the assembled closure as shown in Fig. 13.

DESCRIPTION OF PREFERRED EMBODIMENTS

The closure in accordance with this invention has two individual parts which are separately produced. These are the lower part 1 and the upper part or cap 2. Only in the assembled state do these two closure parts 1, 2 result in the complete closure 3, as shown in Figs. 3, 8, 13 and 14. For this invention, the presence of casing walls on the lower part 1, as well as on the cap 2, is necessary in order to obtain a closure which is simple to assemble, has no protruding elements and also meets esthetic requirements. Protruding elements are always a problem for entire handling

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Accordingly, one closure element and another closure element are often mentioned in the following description in order to clarify interchangeability of the terms the lower part and the cap.

A first embodiment is represented in Figs. 1 to 5. The lower closure part 1 in Fig. 1 has a cylindrical casing wall 10. The lower part 1 has fastening means with which the lower part 1 can be fastened on a container. The fastening means are conventional, for example, a screw thread arranged on the inner wall of the cylindrical casing wall 10, or fastening cams or fastening beads, depending on whether it is intended to screw or press the lower part 1 on a container.

On the top, the lower part 1 is closed off by a cover surface 11, in which a pouring opening or, as in this case a pouring spout 12, is arranged. In a conventional manner, the pouring spout has a circumferential sealing or holding bead 13. Recesses 14 are shown in the lateral view of Fig. 1, which permit the movable spring elements to be free. These cutouts are inwardly offset toward the center in relation to the outer surface of the casing wall 10. The recesses 14 can be offset so far toward the interior that openings are created, which communicate with the interior space of the lower part 1 or, as represented here, are closed by the casing wall. A cam 15 placed on the cover surface 11 is shown, which during the closing process of the assembled closure is used as a stop for the cap edge and thus makes a main hinge between the lower part 1 and the cap 2 superfluous.

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The cap 2 matching the lower part 1, as in Fig. 1, is shown in Fig. 2. In this embodiment a security strip 4 is applied by injection molding to the cap 2. The cap 2 has a cover surface 21 adjoined by a circumferential casing wall 20. In the example shown, the casing wall 20 extends vertically with respect to the cover surface 21. However, as already mentioned, the casing wall 20 could also extend inclined with respect to the cover surface 21, so that the entire cap 2 has a conical shape. This would require a corresponding shape of the lower part 1 and its casing walls 10. The security strip 4 is arranged on the lower edge 22 of the cap 2 via strips 41 which act as predetermined breaking points. Slits 23 can be seen, which are oriented upward from the lower cap edge and leave the spring elements 24 free, which are connected in one piece with the cap 2. The transition of the spring elements 24 to the casing wall 20 occurs via film hinges or thin places 25, which here extend obliquely. On their lower end, the two spring elements 24 are connected with each other via a bridge-like coupling element 27. The transition from the coupling element 27 to the two spring elements 24 can also occur via film hinges 26.

Actually, the spring elements 24 are merely parts which transmit tensile forces, wherein the tensile forces result in an elastic bending deformation of adjoining areas of the casing walls 10, 20.

It can be practical for later assembly to extend the coupling element 27 exactly as far downward over the lower cap edge 22 as the lower edge of the security strip 4, so that a circumferential support surface is created for all practical purposes,

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which is particularly advantageous for handling. Such components do not hang up in assembly devices with shaker conveyors, in particular. Two different fastening means are represented on the coupling element 27, which can be used alternatively or together. For one, a hook-shaped, outwardly directed sharp-edged bead 28 is shown on the lower edge, which can act together with a corresponding groove on the inside of the casing wall 10 of the lower part 1. Also, windows 29 are represented, which can be engaged interlockingly and/or in a frictionally connected manner by cams on the inside of the casing wall 10 of the lower part 1.

A casing wall area 35 which is free remains between the two spring elements 24 and acts together with the cam 15 on the lower part 1. This casing wall area 35, which is free, acts as an one-armed spring lever, which rests against the cam 15. In the completely open state, these two elements are not in engagement with each other, but rather only contact each other during closing and then provide a corresponding restoring force, such as is customary with snap hinges.

As shown in Fig. 3, such a two-part closure provides an esthetically perfect solution which hardly shows that this is not a single-piece closure.

Fig. 4 shows the lower part 1 in a top view. The cover surface 11 with the pouring spout 12 arranged in the center is clearly seen. This view is used in particular to show the arrangements of the cutouts, or openings, into which the coupling element 27, or the spring elements 24, can be pushed. In a radially outward extending direction from the spout 12 arranged in a centered manner, it is possible to

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A second variation of the two-part plastic closure of this invention is represented in Figs. 6 to 9. The lower part is identified by element reference numeral 1, the cap by element reference numeral 2 and the entire closure by element reference numeral 3. The element reference numeral 4 is for the security strip, and element reference numeral 41 also means the connecting webs 41 here, with which the security strip is fastened, in this case on the lower part 1.

The lower part 1 in Fig. 6 has a circular-cylindrical casing wall 10. A vertically raised material strip 100 extends flush with this outer surface of the casing wall and comprises a snap hinge 103 having a center area 124, which has a function corresponding to the spring element 24 in the previous embodiment. Here, the transition of this spring element 124 to the lower part 1, or to the casing wall 10 of the lower part 1, occurs by a film hinge 125 extending in an arc. A diametrically opposed film hinge 126 forms a line of separation between the spring element 124 and the coupling element 127. Both film hinges 125 and 126 are shown in dashed lines, because they can hardly be seen in this view. A solution similar to the one represented in the first embodiment can also be used with such a design of the spring element, or the coupling element 124, 127. It is possible to provide the cap 2 with a receiving slit, into which the coupling element 127 can be pushed and wherein a correspondingly shaped recess in the casing wall is provided, which would correspond to the course of the upper film hinge 126.

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Moreover, a rib, which is oriented approximately radially outward, is provided as a pressing element 19 in the interior chamber of the lower element 1. The pressing element 19 works together with a retaining projection 19', which extends through at least one window 29 on the coupling element 27. The pressing element 19 makes it impossible to pull the retaining projections 19' out of the window 29, to provide a frictionally connected and interlocking connection between the lower part 1 and the cap 2.

A recessed grip 17 is formed in the casing wall 10 of the lower part 10 opposite the hinge.

A further preferred embodiment of this invention is represented in Figs. 11 to 14. This embodiment results in a particularly compact solution which is unproblematic in regard to assembly, because the two parts can be plugged vertically together in any arbitrary angle position. This results in a particularly cost-effective assembly, because an appropriate alignment is not necessary and the individual parts have no asymmetrically projecting parts which could lead to a hang-up when manufacturing.

The cap by itself is represented in Fig. 11 in a diametrical vertical section. The cap has a cylindrical casing wall 20 with a spring element 204 designed as a snap hinge. This snap hinge has a film hinge 201 which forms the articulated connection between the spring element 204 and the casing wall 20 of the cap or upper part 2, and a second lower film hinge 202 which forms the articulated connection

[illegible]

between the spring element 204 and the coupling element 207 adjoining it on the bottom. Accordingly, the snap hinge 200 is formed by the elements 201, 202 and 204. The snap hinge 200 is bordered in the radial direction by slits 203. The coupling element 270 has a closed ring-shaped form and is connected directly flush under the casing wall 20 with the latter. Here, the coupling element 270 is formed on the casing wall 20 not only by means of the snap hinge 200, but also by a tear seam 217. The tear seam 217 extends from the one lateral border of the snap hinge, extending around it, to the other lateral border 203 of the snap hinge 200 and terminates in the respective slits 203. After cutting the tear seam 217, the coupling element 270 is only connected with the casing wall 20 of the upper part 2 by the spring element 204, the same as in the previously described solutions. The tear seam 217 can be embodied as a continuous thin place or, as known in technology, as a predetermined separating place by using appropriate webs. In the form represented here, the tear seam 271 is represented as a continuous thin place. The lower edge of the casing wall 20 is formed by a pressure bead 205, which projects in an outward direction peripherally circulating. At the first use, the pressure by the user on the pressure bead 205 leads to the severing of the tear seam 271. Two inward projecting retaining beads 206 designed with sharp edges are formed on the inner surface of the circumferential coupling element 270, which are used for the interlocking connection with the embodiment of the lower part 1 represented in Fig. 12. Here, too, the cap 2 has a sealing plug 33, which has a circumferential sealing bead 34.

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In this embodiment the lower part 1 also has a circumferential casing wall 10 with an upper area 210 offset toward the interior by approximately the casing wall thickness. Ring-shaped circumferential retaining notches are formed on the exterior surface of the area 21', into which the retaining beads 206 snap in an interlocking manner, in the assembled state of the closure. A security strip 400 is formed on the shoulder 212 formed in the transition area of the casing wall 10 to the inwardly offset upper area 210. The attachment can be embodied as a tear seam 401 or as a predetermined breaking point by using appropriate bridges, which can be cut. The upper edge of the security strip 400 is formed, projecting toward the interior, as a retaining lip 402. The retaining lip 402 is located above the cover surface 21, through which a spout 12 extends. In the closed state, the sealing bead 34 of the previously described sealing plug 33 comes to rest sealingly in the mouth area of the pouring spout 12. An annular wall 16 on the underside of the cover surface 11 is used as a seal against the bottle neck on which the closure is to be placed. A screw thread or, as represented here, a number of holding nubs 17, can be used for fastening on the container neck.

The closure 3 is represented assembled in Figs. 13 and 14. The actual connection between the lower part 1 and the cap, or upper part 2, is practically not visible, because this area is completely covered by the security strip 400. The tongue 403 of the security strip 400 is visible in Fig. 13, while in the position in accordance with Fig. 14, rotated by 180°, the security strip 400 extends continuously. The

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retaining lip 402 on the security strip 400 covers the pressure bead 205, which is not visible. Only a short section of the pressure bead 205 is shown in the separation area of the tongue 403. The embodiment represented here has many advantages. In regard to production technology and assembly technology it is the version which can be produced best and assembled best. Also, there is a double security feature, because it is necessary prior to the first opening to remove the security strip 400 first, and then to sever the tear seam 271.

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List of Reference Numerals

- | | |
|-----|--------------------------|
| 1 | Lower part |
| 2 | Cap |
| 3 | Closure |
| 4 | Security strip |
| 10 | Casing wall |
| 11 | Cover surface |
| 12 | Pouring spout |
| 13 | Retaining bead |
| 14 | Recess in the lower part |
| 15 | Cam |
| 16 | Receiving slit |
| 17 | Holding nubs |
| 18 | Centering lip |
| 19 | Pressing element |
| 19' | Retaining projection |
| 20 | Casing wall of the cap |
| 21 | Cover surface |
| 22 | Lower cap edge |
| 23 | Slits |

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- 24 Spring elements
- 25 Thin places
- 26 Film hinge
- 27 Coupling element
- 28 Sharp-edged bead
- 29 Window
- 33 Sealing peg
- 34 Sealing bead
- 35 Casing wall area
- 41 Connecting webs
- 100 Stacked material strips
- 120 Recess
- 121 Cover surface
- 122 Support ribs
- 123 Interlocking means
- 124 Area as a spring element
- 125 Film hinge
- 126 Film hinge
- 127 Coupling element
- 128 Support ribs
- 200 Snap hinge

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201 Film hinge

202 Film hinge

203 Slits, lateral border

204 Spring element

205 Pressure bead

206 Retaining beads

210 Upper area of the wall area 10

211 Retaining notches

212 Shoulder

270 Coupling element

271 Tear seam

400 Security strip

401 Tear seam

402 Retaining lip

Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

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☒ hier beigefügt ist.

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Anmeldungsseriennummer _____

eingereicht wurde und am _____
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Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TWO-PART PLASTIC SNAP HINGE CLOSURE

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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Prior foreign applications
Priorität beansprucht

Priority Claimed

<u>1290/99</u> (Number) (Nummer)	<u>Switzerland</u> (Country) (Land)	<u>13 July 1999</u> (Day/Month/Year Filed) (Tag/Monat/Jahr eingereicht)	<input checked="" type="checkbox"/> Yes Ja	<input type="checkbox"/> No Nein
<u>185/00</u> (Number) (Nummer)	<u>Switzerland</u> (Country) (Land)	<u>31 January 2000</u> (Day/Month/Year Filed) (Tag/Monat/Jahr eingereicht)	<input checked="" type="checkbox"/> Yes Ja	<input type="checkbox"/> No Nein
<u> </u> (Number) (Nummer)	<u> </u> (Country) (Land)	<u> </u> (Day/Month/Year Filed) (Tag/Monat/Jahr eingereicht)	<input type="checkbox"/> Yes Ja	<input type="checkbox"/> No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 112 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT Internationale Anmeldedatum dieser Anmeldung bekannt geworden sind.

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None	None	None	
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhangig aufgegeben)	(Status) (patented, pending, abandoned)
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German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following Attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

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AUTHORIZATION OF ATTORNEYS TO ACCEPT AND FOLLOW INSTRUCTIONS FROM REPRESENTATIVE

The undersigned to this declaration and power of attorney hereby authorizes the U.S. attorneys named above to accept and follow instructions from

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